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# INTERNAL UREDINIA<sup>1</sup>

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(With PLATE 186, Containing 2 FIGURES)

The spores of the Uredinales are developed usually in sori just below the cuticle or epidermal layer and are liberated by early rupturing or by the weathering away of the overlying tissue in the case of some resting spores. There are deviations from this development in certain resting spores which are sometimes buried singly in the host tissues which are dependent for liberation also upon the weathering away of the overlying tissues. Exception to the usual development of sori has been reported by Wolf, Reddick, Edgerton, and others.

Internal aecia were first reported by Wolf<sup>2</sup> in *Puccinia angustata* Peck upon *Lycopus virginicus* L., as appearing in the younger tissues of the stem or petiole, being similar in origin, structure, size, and form to those which are erumpent at maturity. Atkinson and Edgerton<sup>2</sup> have observed *Nigredo Caladii* (Schw.) Arth. (*Uromyces Caladii* Farl.) to form internal cluster cups in *Peltandra virginica* (L.) Kunth and Reddick<sup>2</sup> has observed them in the fruits of barberry.

Internal uredinia of *Dicaeoma poculiforme* (Jacq.) Kuntze (*Puccinia graminis* Pers.) liberating the urediniospores into the interior of the hollow stem of rye have been observed by Reddick.<sup>2</sup> Another aberrant case has been found in the production of internal uredinia of *Nigredo caryophyllina* (Schränk.) Arthur (*Uromyces caryophilinus* Schröter) in the leaves of *Dianthus caryophyllus* L. Specimens of the rust-infected leaves were collected from plants growing in the greenhouse of the Pennsylvania State College. The leaves are succulent and are favorable

<sup>1</sup> Contribution from the Department of Botany, Pennsylvania State College, No. 4.

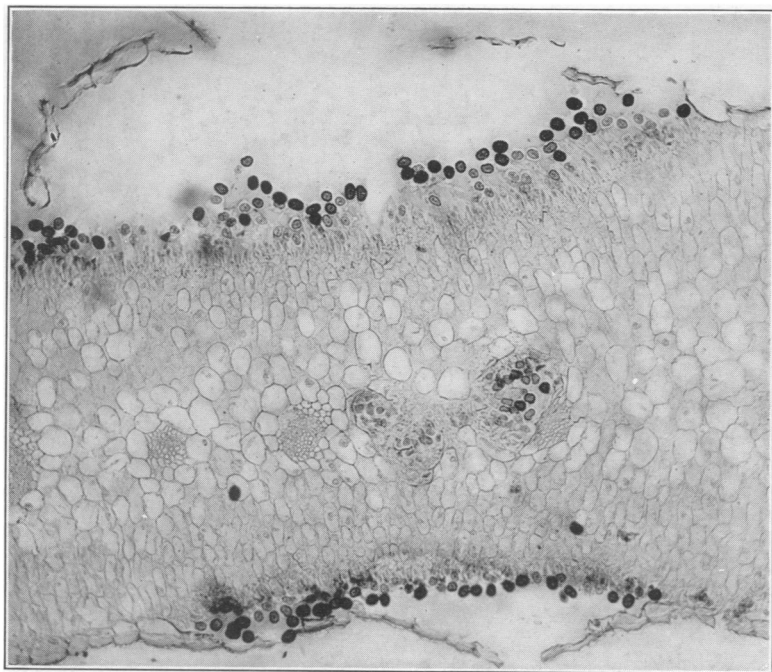
<sup>2</sup> Wolf, F. A., Internal Aecia, MYCOLOGIA, Vol. V, No. 6.

for wide ramification of the rust mycelium. In many instances, the uredinia are found to rupture on opposite surfaces of the leaves and under such conditions internal uredinia were found in the central portion of the mesophyll and occurred as well-developed sori with mature spores. In some instances they were observed to develop adjacent to the bundle tissues.

The mycelium of the internal sori was abundant and could be traced easily to the subepidermal sori. The internal sori appear somewhat spherical and the mycelium produces rather a pseudo-parenchymatous layer crowding the adjacent cells of the mesophyll. In some sections, pockets or masses of mycelium were found which evidently were immature sori. The matured spores were similar in size and color to those produced subepidermally.

Since the development of the uredinial stage is supposed to be subepidermal as a rule, this deviation seems worthy of note. Such a deviation from the usual method probably represents an abnormal rather than a typical condition. In this species the development of the internal uredinia is favored by the abundant mycelium from the upper and lower subepidermal sori and by the texture of the leaf which allows wide ramification of the rust mycelium.

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CROSS SECTION OF CARNATION LEAF WITH THREE INTERNAL SORI, ONE OF WHICH IS ENLARGED IN THE LOWER FIGURE